Hurricane Data Analysis Tool

http://disc.gsfc.nasa.gov/HDAT

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Abstract

In order to facilitate Earth science data access, the NASA Goddard Earth Sciences Data Information Services Center (GES DISC) has developed a web prototype, the Hurricane Data Analysis Tool (HDAT; URL: http://disc.gsfc.nasa.gov/HDAT), to allow users to conduct online visualization and analysis of several remote sensing and model datasets for educational activities and studies of tropical cyclones and other weather phenomena. With a web browser and few mouse clicks, users can have a full access to terabytes of data and generate 2-D or time-series plots and animation **without downloading any software and data.**

HDAT includes data from the NASA Tropical Rainfall Measuring Mission (TRMM), the NASA Quick Scatterometer (QuikSCAT) and NECP Reanalysis, and the NCEP/CPC half-hourly, 4-km Global (60ºN - 60ºS) IR Dataset.

The GES DISC archives TRMM data. The daily global rainfall product derived from the 3-hourly multi-satellite precipitation product (3B42 V6) is available in HDAT. The TRMM Microwave Imager (TMI) sea surface temperature from the Remote Sensing Systems is in HDAT as well. The NASA QuikSCAT ocean surface wind and the NCEP Reanalysis provide ocean surface and atmospheric conditions, respectively. The global merged IR product, also known as, the NCEP/CPC half-hourly, 4-km Global (60ºN - 60ºS) IR Dataset, is one of TRMM ancillary datasets. They are globally-merged pixel-resolution IR brightness temperature data (equivalent blackbody temperatures), merged from all available geostationary satellites (GOES-8/10, METEOSAT-7/5 & GMS). The GES DISC has collected over 10 years of the data beginning from February of 2000. This high temporal resolution (every 30 minutes) dataset not only provides additional background information to TRMM and other satellite missions, but also allows observing a wide range of meteorological phenomena from space, such as, hurricanes, typhoons, tropical cyclones, mesoscale convection system, etc.

Basic functions include selection of area of interest and time, single imagery, overlay of two different products, animation, a time skip capability and different image size outputs. Users can save an animation as a file (animated gif) and import it in other presentation software, such as, Microsoft PowerPoint. Since the tool can directly access the real data, more features and functionality can be added in the future.

Data

- SST (0.25 x 0.25 degree) and daily precipitation (0.25 x 0.25 degree, derived from 3B42V6) from **TRMM TMI.**
- Ocean surface wind (reduced from the original 0.25 x 0.25 degree to 1.0 x 1.0 degree for better visualization) from **QuikSCAT**.
- NCEP Reanalysis 1-degree, 6-hourly sea level pressure, and winds of 850-hPa, 700-hPa and 200-hPa.
- Merged IR (4 km) from geostationary satellites (GOES-8/10, METEOSAT-7/5 & GMS).

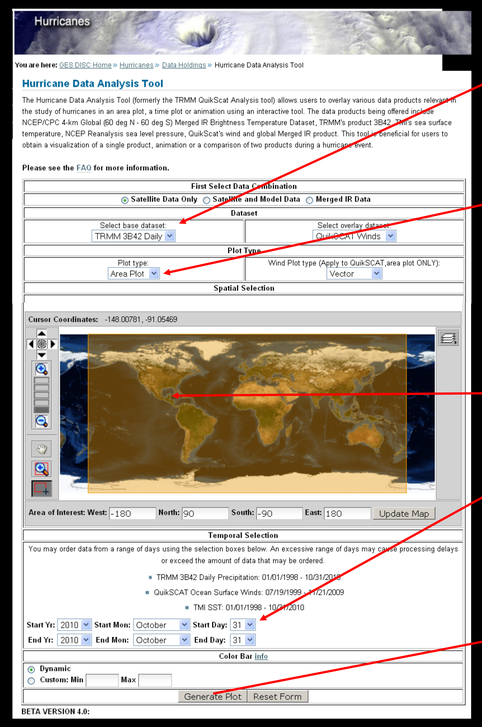
Note: Currently, this online tool only provides plots for visualization analysis. Users could access and order original data from, the GES DISC DAAC (TRMM precipitation), the Physical Oceanography DAAC at JPL (QuikSCAT), and the Remote Sensing Systems (TRMM TMI SST), respectively.

Tool Description

All maps and plots in this tool are generated by using a widely used community software, the Grid Analysis and Display System (GrADS), developed the Center for Land and Atmosphere (COLA). A form based web interface (below) collects inputs from user for analysis and the result (a map or a plot) is sent to a separate new window for display (see below).

Functions:

- Area Plot. Generate a latitude-longitude map for a region of interest.
- Time Plot. Generate a time series plot for a region of interest.

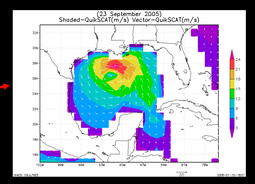


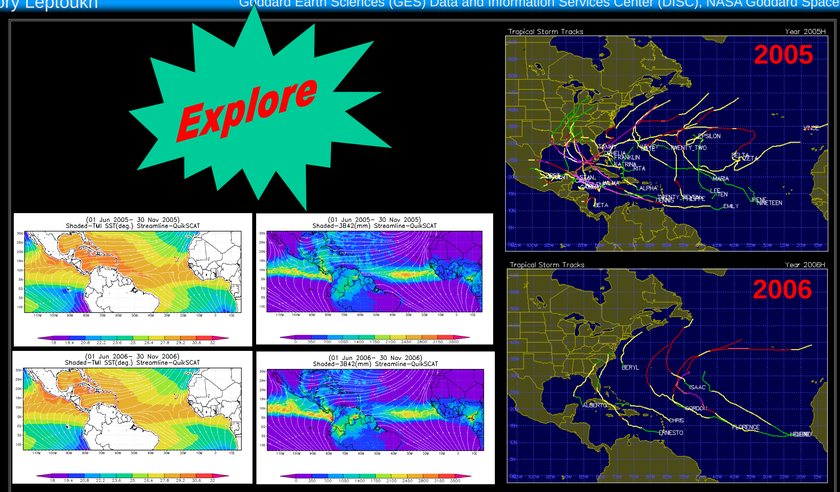
Select Data Products

Select Plot Type

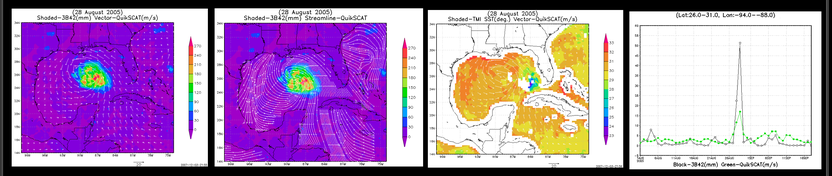
Select a Region

Select Time

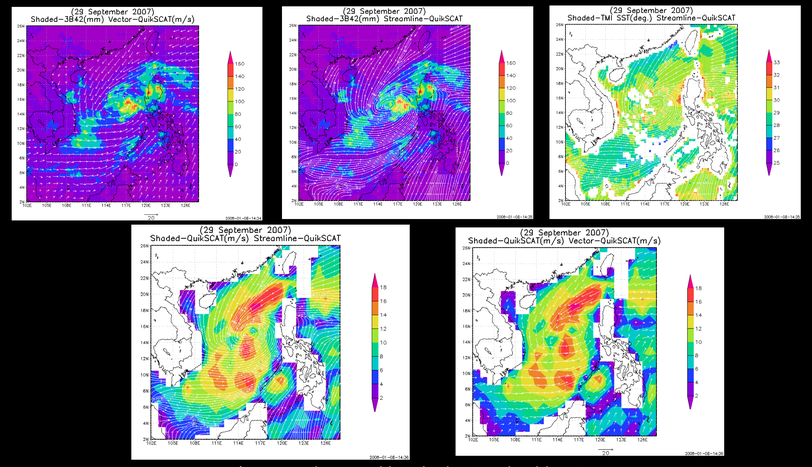




Above: TRMM and QuikSCAT analyses for 2005 (high activities) and 2006 (low activities) hurricane seasons.

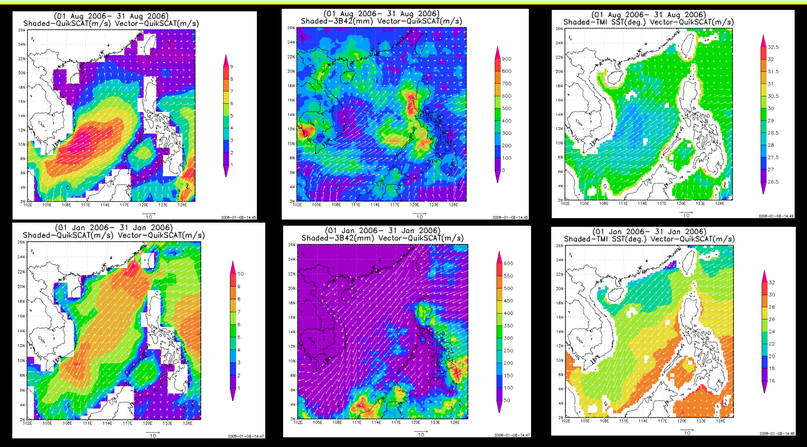


Above: TRMM and QuikSCAT daily data analyses of Katrina.

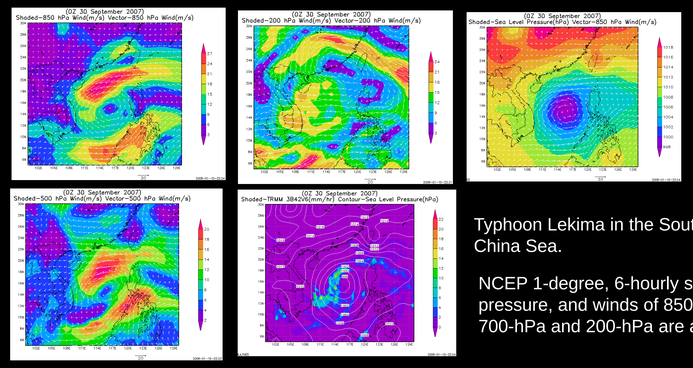


Above: Typhoon Lekima in the South China Sea.

Monsoon Studies

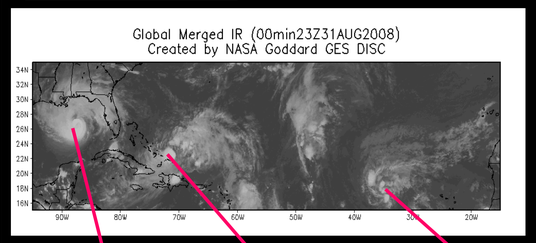


Above: Monsoon in the South China Sea, summer (upper panel) vs. winter (lower panel)



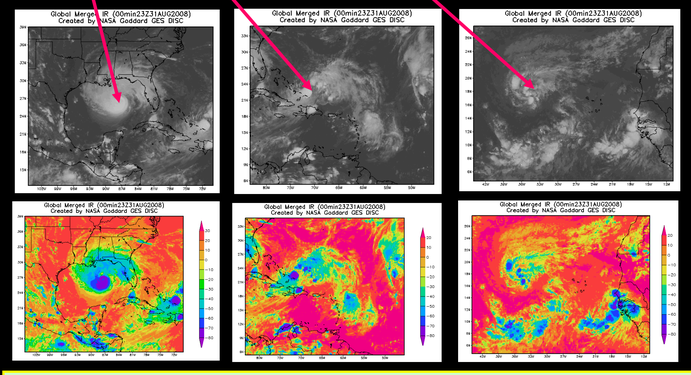
Typhoon Lekima in the South China Sea.

NCEP 1-degree, 6-hourly sea level pressure, and winds of 850-hPa, 700-hPa and 200-hPa are available.

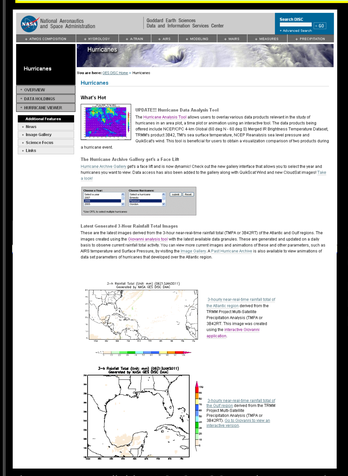


Left: A large scale image on August 31, 2008 at 23Z showing Hurricane Gustav, Tropical Storm Hanna and Tropical Storm Ike (from left to right).

Left below: black and white IR images (1st row) and their false color images (bottom row)



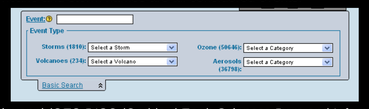
Other Resources for Hurricane Studies



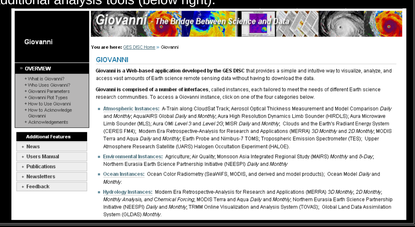
Above: More available at GES DISC Hurricane Portal (http://disc.sci.gsfc.nasa.gov/hurricane)

Above: More data are available at GES DISC Mirador (http://mirador.gsfc.nasa.gov).

Below: The events search option allows a user to search Mirador by an event name. Hurricane, storm, cyclone, typhoon, volcano, ozone, aerosols, pm10, pm2.5 hurricane and storm names are all considered events.



Below: Giovanni (GES-DISC (Goddard Earth Sciences Data and Information Services Center) Interactive Online Visualization ANd aNalysis Infrastructure) contains additional analysis tools (below right).

A-Train	Aerosol Daily	Aerosol Monthly	Agriculture	Air Quality
Aqua/AIRS Daily	Aqua/AIRS Monthly	Aura HIRDLS	Aura MLS	Aura OMI L3
Aura OMI L2G	CERES (FM4)	GLDAS Monthly	MAIRS Monthly	MAIRS 8-Day
MERRA MONTH 2D	MERRA MONTH 3D	MERRA MONTH ANA	MERRA MONTH CHM	MISR Daily
MISR Monthly	MODIS Daily	MODIS Monthly	NEESPI Daily	NEESPI Monthly
Ocean Color Radiometry	Ocean Model Daily	Ocean Model Monthly	TOMS	TRMM/TOVAS
TES	UARS HALOE			

Above: Giovanni instances.